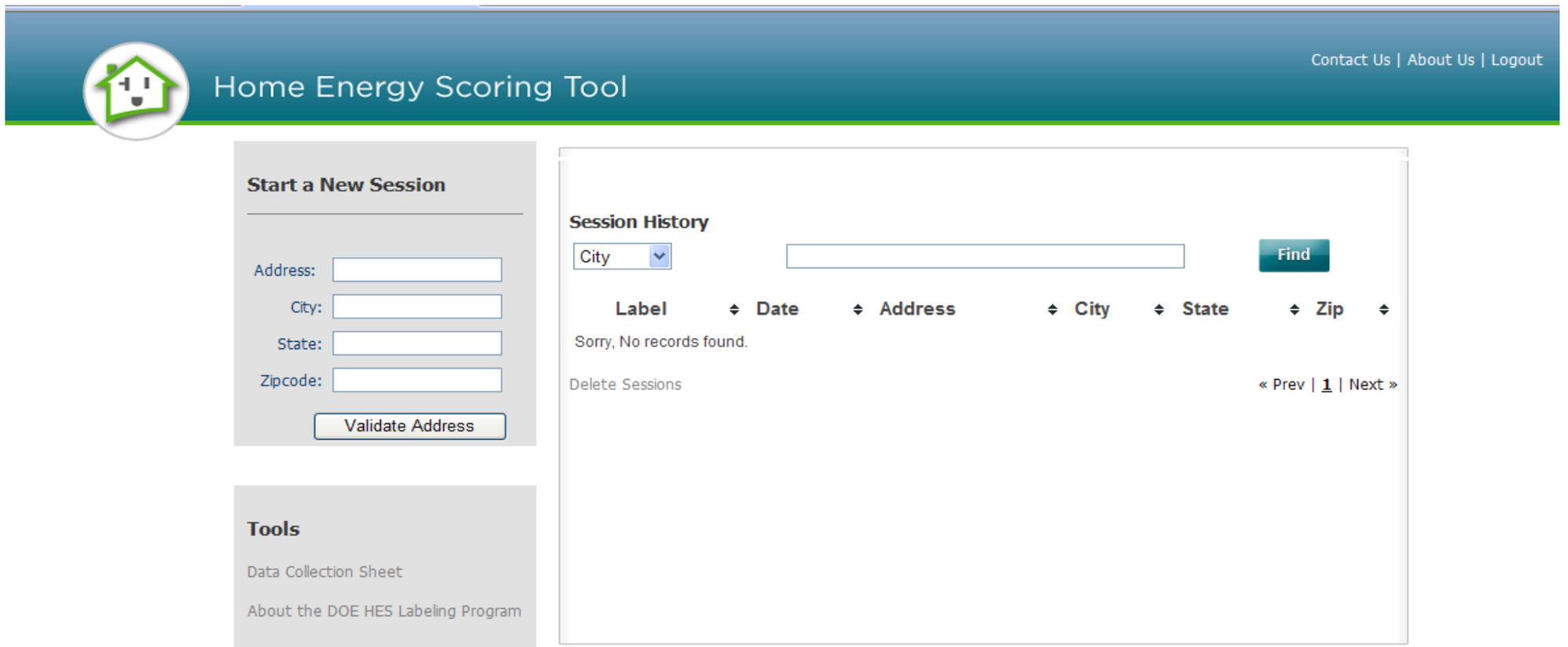
# Home Energy Scoring Tool: Assessor Training



# Program Background

- Home owners and buyers need credible and actionable information before they can undertake energy improvements.

- Toward that end, the Department of Energy (DOE) has developed the Home Energy Score – a low cost, high value assessment that can be a provided as a stand-alone service or as an add-on to home inspections and energy audits.

- To generate a Home Energy Score, qualified assessors must use the Home Energy Scoring Tool (tool) – an easy to use software tool developed by DOE through the Lawrence Berkeley National Laboratory.

# How to Become a Qualified Assessor

- You must
  1) Be certified by the Building Performance Institute (BPI) or by a Residential Energy Services Network (RESNET) Provider
  2) Provide certification documentation to DOE
  3) Complete this online training, and
  4) Receive a passing grade on the test that follows.

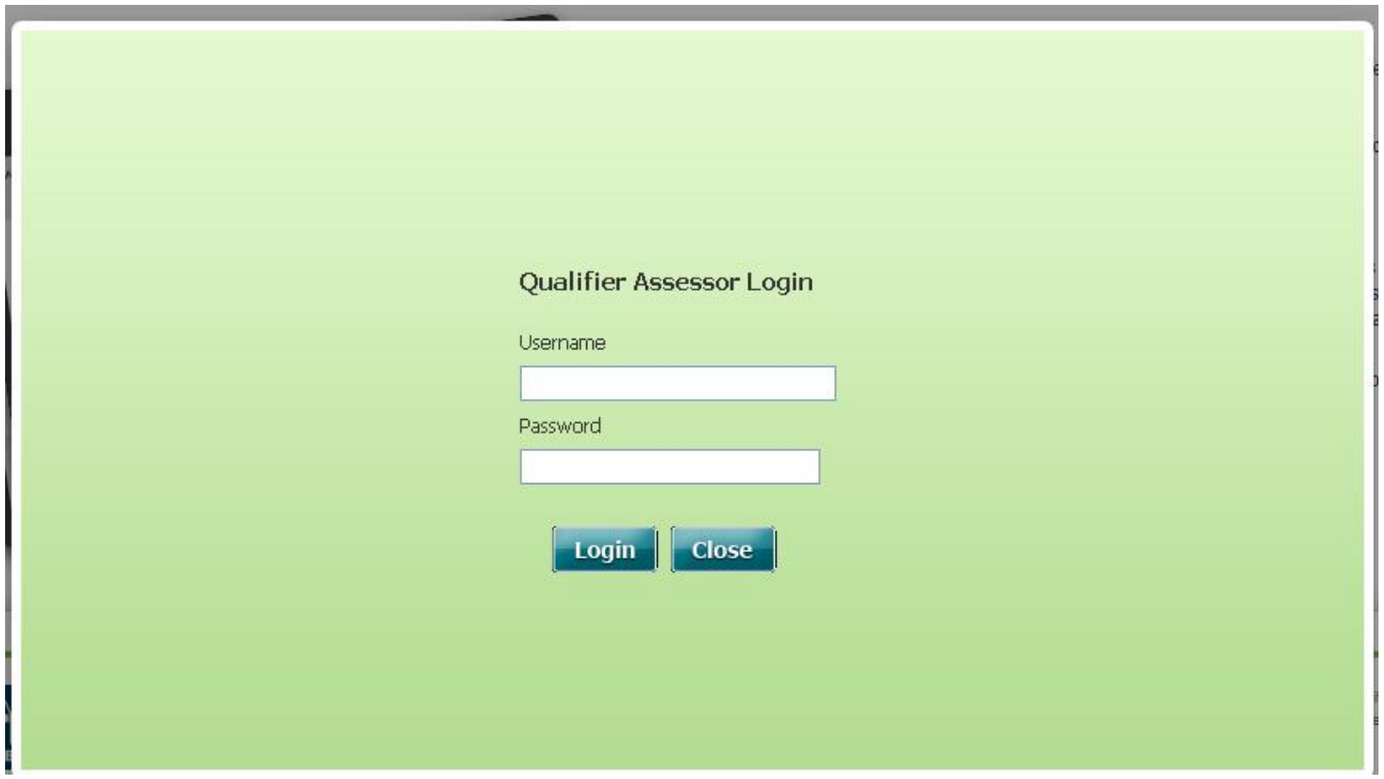
# Where to Submit Proof of Certification

- Send proof of current certification -- document produced by BPI or RESNET provider indicating the start and end dates of your certification – to DOE via email or fax.
- If you choose to fax the documentation, send a brief email as well indicating that you are faxing the documentation.
    - Email: homeenergyscore@sra.com
    - Fax:  240-223-5501
- Updated documents will need to be sent at the time of certification renewal.

# Accessing the Home Energy Scoring Tool

- After completing the test,
  - Press completed button to receive notification of pass/fail
  - If you score 75 or greater, you pass
  - You will receive a username and password by email to access the Home Energy Scoring Tool
- During the pilot stage of the program
  - QA's may not provide scores outside the pilot area
  - Usernames will be 6 digits
  - Passwords will be randomly generated
  - Neither the username nor password can be changed
  - If you misplace your username or password, contact Home Energy Score via email at homeenergyscore@sra.com

# Accessing the Home Energy Scoring Tool



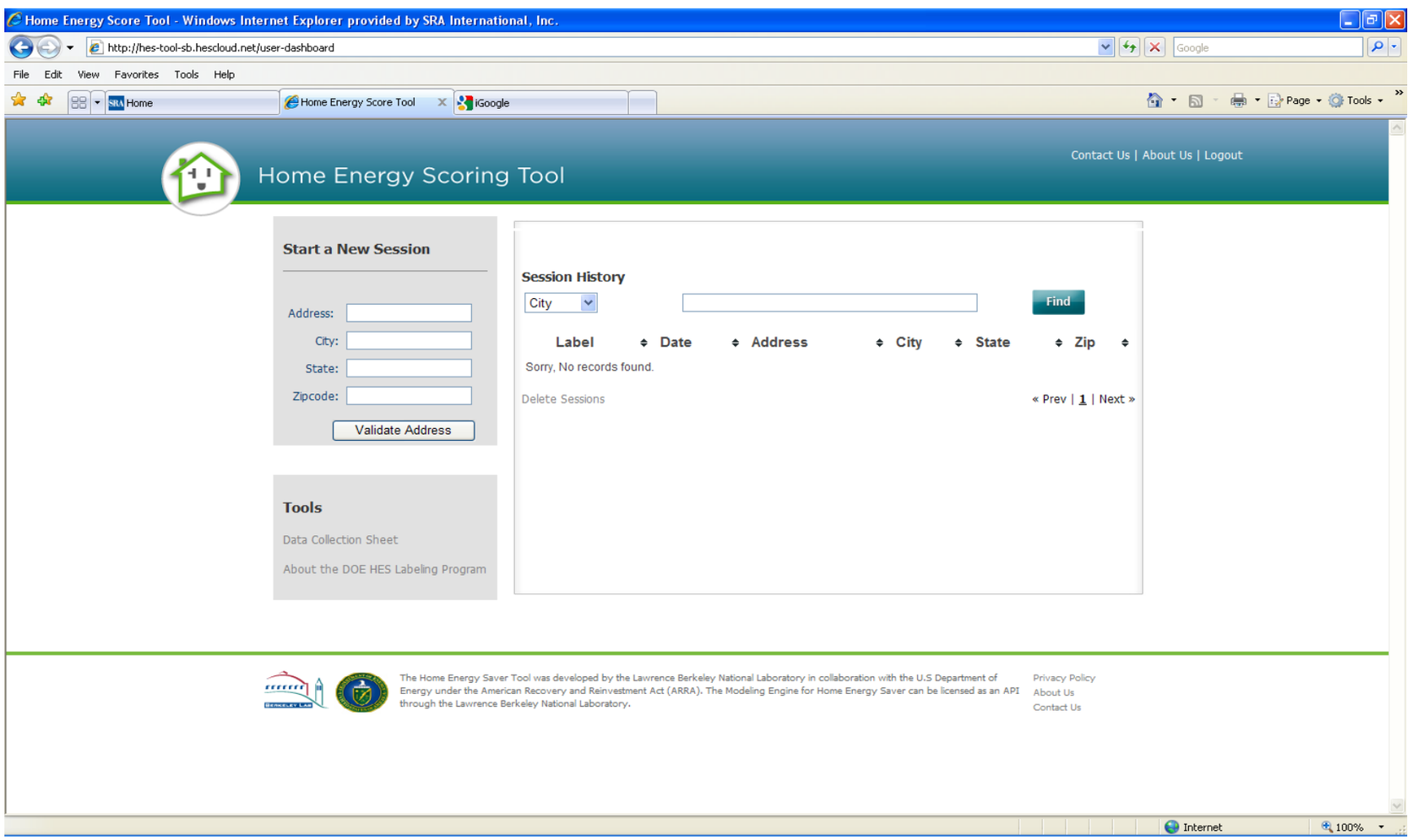

- Go to homeenergyscore.lbl.gov
- Enter your DOE provided user name and password
- Click on Login to get linked to the Dashboard
- If you have trouble logging in contact the DOE administrator at homeenergyscore@sra.com.

# Troubleshooting

- If you have questions about the appropriate values to use during data entry, click the  next to that entry. This will provide further information.
- If you have questions that cannot be addressed as indicated above, click on Help, then “Let us Know” at the bottom of the page.
- Complete the form that appears and the help desk will respond by email.
- The form will request the session id.  This can be found by putting the mouse pointer over the address of the troublesome record on the dashboard screen and reading the last 7 digits of the web address displayed in the lowest left corner of the screen.

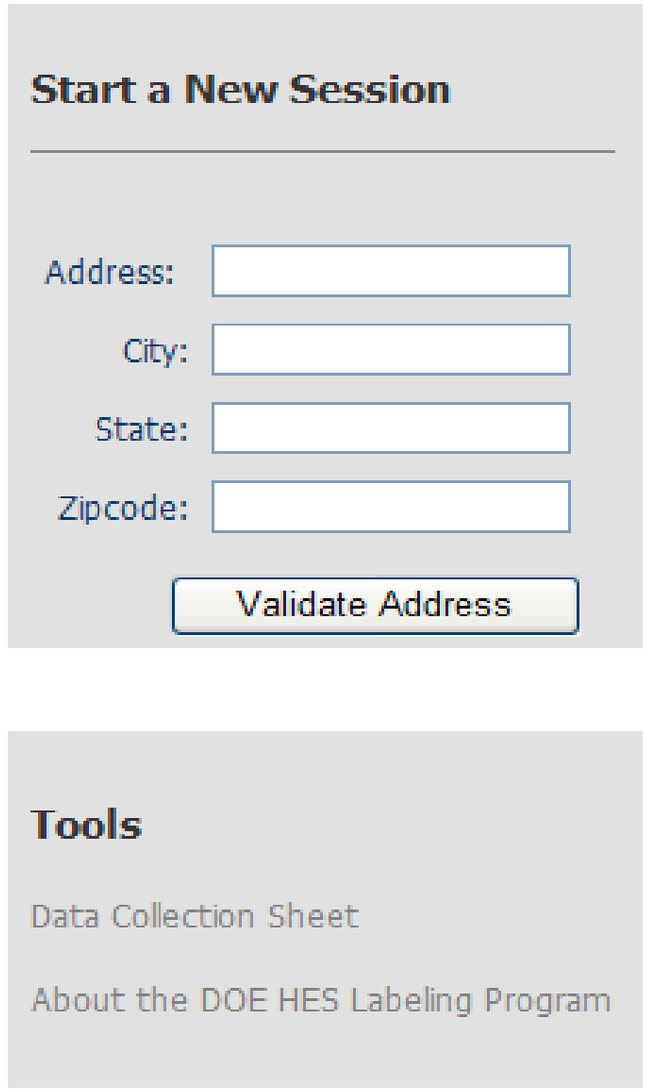
# Scoring Tool Dashboard

- At the Dashboard, you can --
  - Access all sessions previously entered
  - Start a new session
  - Download worksheets
  - Review program information



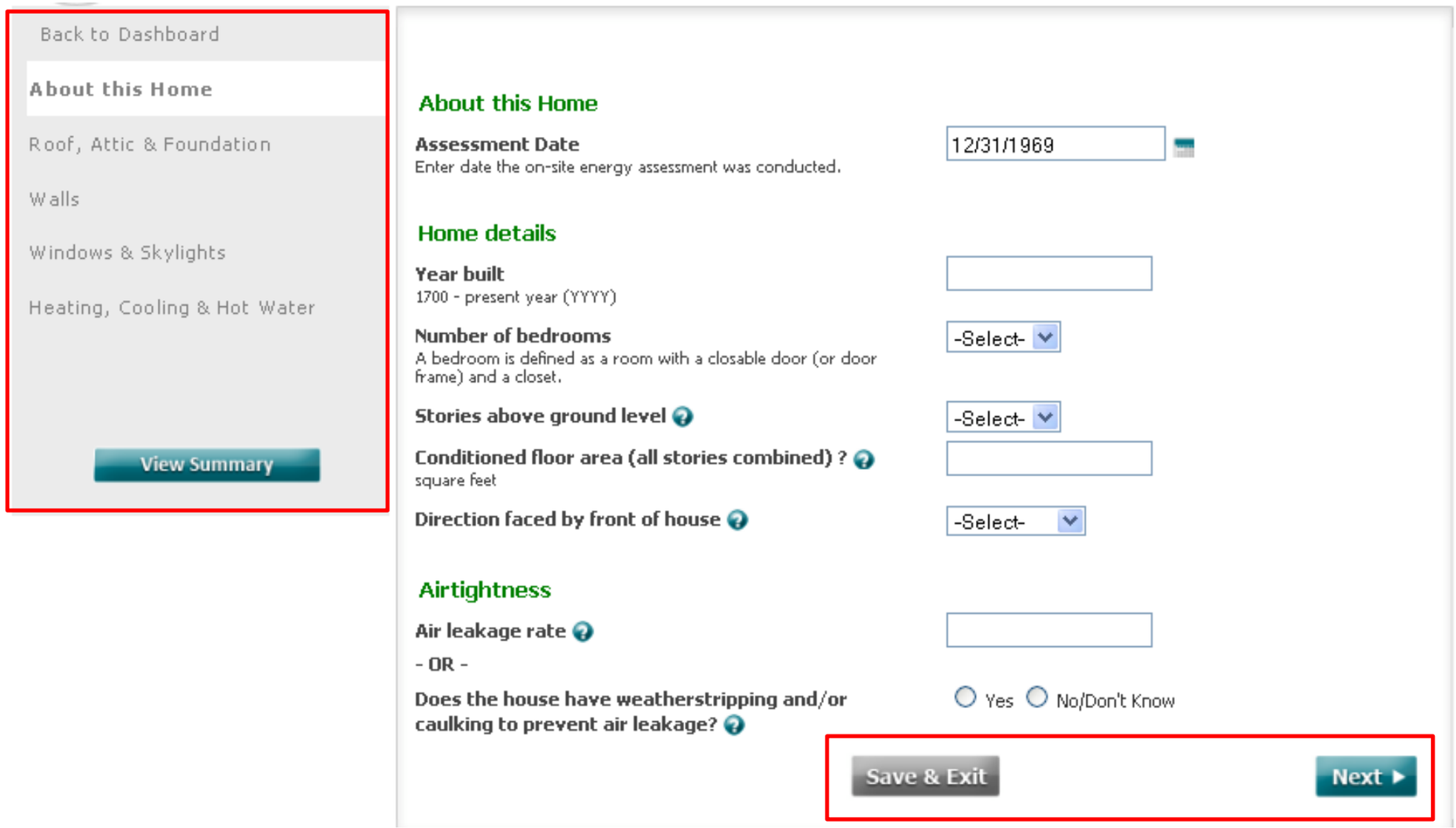
# Starting a New Session

- To start a new session
  - Input the address information for the house on the left side of the screen
  - Click “Validate Address”
    - The address will be standardized
    - If address will not validate, this is likely due to zip code mismatch
      - Go to http://zip4.usps.com/zip4/welcome.jsp to get a correct match



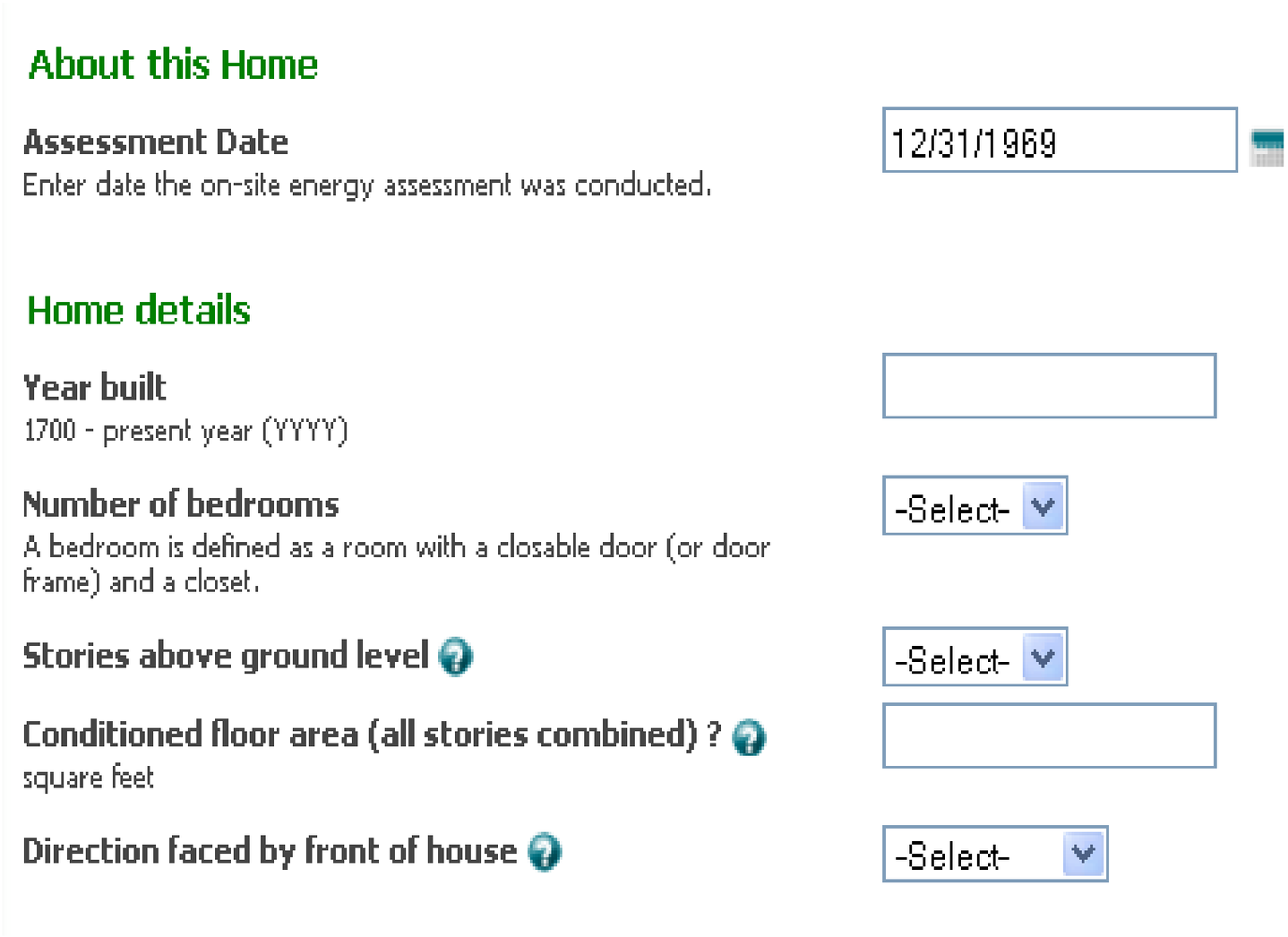
# Navigation

- Use the navigation links on the left or buttons along the bottom of the screen (Next; Save and Exit; Previous) to move through the data entry process.
- The data may be input in any order.
- You may save the data at any point by clicking on Save and Exit.  This will save any entered data and take you to the dashboard.



# Audit Details

- Enter House information
  - Inspection Date
  - Year Built
  - Number of bedrooms (room with a closable door or door frame and a closet)
  - Number of stories above ground level
  - Conditioned Floor Area (total square feet for all conditioned levels)
  - Compass direction that the front door faces



# Audit Details

- The scoring tool will calculate house dimensions based on the conditioned square footage, number of floors above grade, foundation type and assumes a wall ratio of 5:3.

- If a basement is unfinished but conditioned, it should be included in the conditioned floor area value.

# House Airtightness

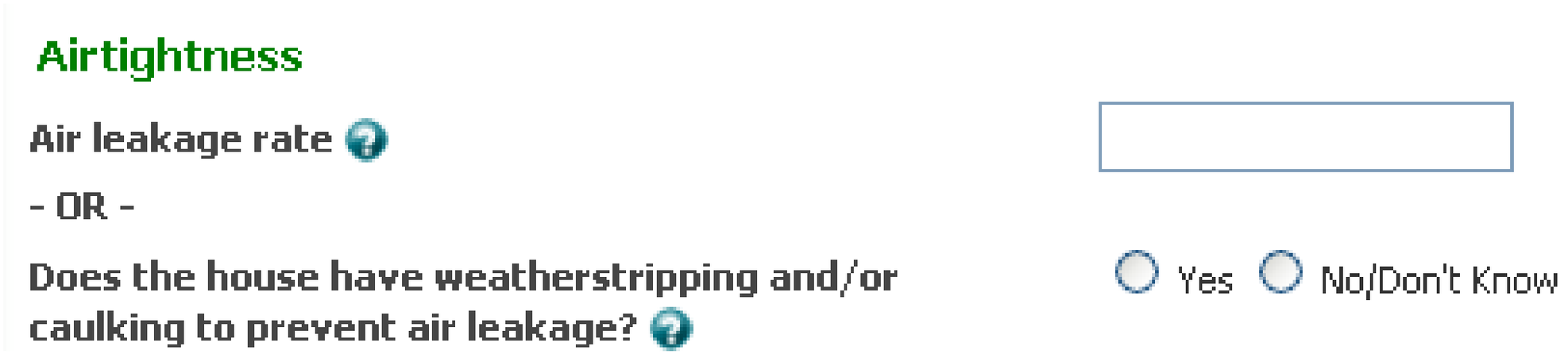
- House Airtightness:  Choose one method

  (A) Input blower door leakage number in cfm50

  **OR**

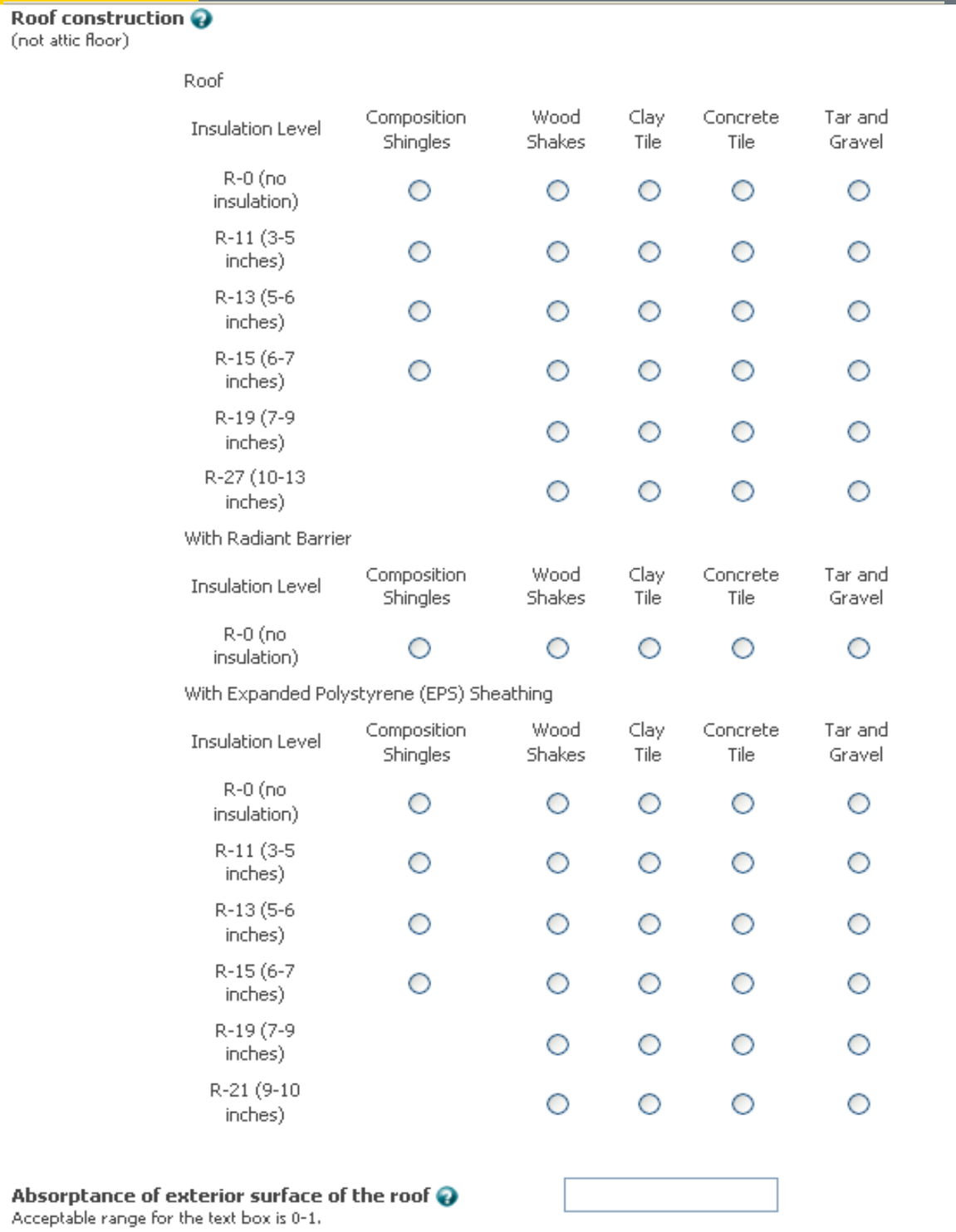
  (B) Choose Yes or No to the question “Does the house have weatherstripping and/or caulking to prevent air leakage. (In other words has the house been air sealed?)

  – If a blower door leakage number is input, it will override the answer to the weatherstipping question.



# Roof

- Use the matrix to choose the roof construction type and insulation level.
  - Choose the roof type that covers more than 50% of the house footprint and use a calculated average (UA) insulation value.
- Enter the roof absorptance as a decimal number between 0 and 1.
  - For new roofs, the homeowners may have this number.
  - For older roofs, estimate based on color where black is 0.90 and white is 0.50.
  - See next page for some typical absorptance values.



**Roof construction**
(not attic floor)

Roof

| Insulation Level | Composition Shingles | Wood Shakes | Clay Tile | Concrete Tile | Tar and Gravel |
|---|---|---|---|---|---|
| R-0 (no insulation) | ○ | ○ | ○ | ○ | ○ |
| R-11 (3-5 inches) | ○ | ○ | ○ | ○ | ○ |
| R-13 (5-6 inches) | ○ | ○ | ○ | ○ | ○ |
| R-15 (6-7 inches) | ○ | ○ | ○ | ○ | ○ |
| R-19 (7-9 inches) | | ○ | ○ | ○ | ○ |
| R-27 (10-13 inches) | | ○ | ○ | ○ | ○ |

With Radiant Barrier

| Insulation Level | Composition Shingles | Wood Shakes | Clay Tile | Concrete Tile | Tar and Gravel |
|---|---|---|---|---|---|
| R-0 (no insulation) | ○ | ○ | ○ | ○ | ○ |

With Expanded Polystyrene (EPS) Sheathing

| Insulation Level | Composition Shingles | Wood Shakes | Clay Tile | Concrete Tile | Tar and Gravel |
|---|---|---|---|---|---|
| R-0 (no insulation) | ○ | ○ | ○ | ○ | ○ |
| R-11 (3-5 inches) | ○ | ○ | ○ | ○ | ○ |
| R-13 (5-6 inches) | ○ | ○ | ○ | ○ | ○ |
| R-15 (6-7 inches) | ○ | ○ | ○ | ○ | ○ |
| R-19 (7-9 inches) | | ○ | ○ | ○ | ○ |
| R-21 (9-10 inches) | | ○ | ○ | ○ | ○ |

**Absorptance of exterior surface of the roof**
Acceptable range for the text box is 0-1.

# Example Absorptance

**Roof Aborptance Help**

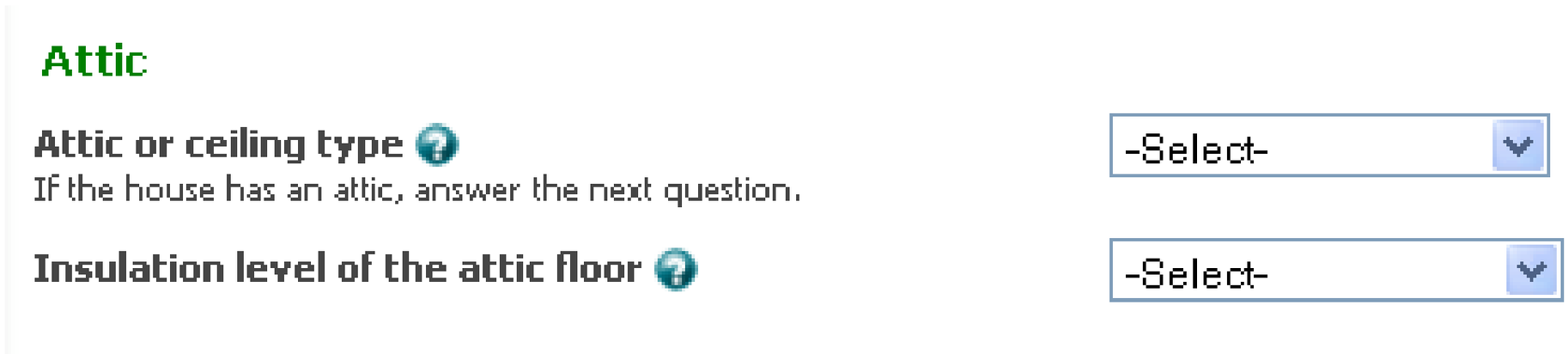
If you have the manufacturer's measured reflectivity (or albedo), enter the value of (1 - reflectivity). Otherwise, estimate the value using the following (use the manufacturers measured reflectance if the roof uses "cool-color" materials).

| | | |
|---|---|---|
| 0.35 | White | Smooth building material surfaces covered with a fresh or clean, stark white paint or coating. |
| 0.55 | Light | Masonry, textured, rough wood, or gravel surfaces covered with a white paint or coating. |
| 0.70 | Medium | Off-white, cream, buff, or other light-colored brick, concrete block, or painted surfaces and white-chip marble-colored roofs. |
| 0.8 | Medium dark | Brown, red, or other dark colored-brick, concrete block, roofs with gravel, red tile, stone, or tan to brown shingles. |
| 0.9 | Dark | Dark brown, dark green, or other very dark-colored painted, coated, or shingled surfaces. |

Close

This is an example of the help screens that are found by clicking on the  .

# Attic

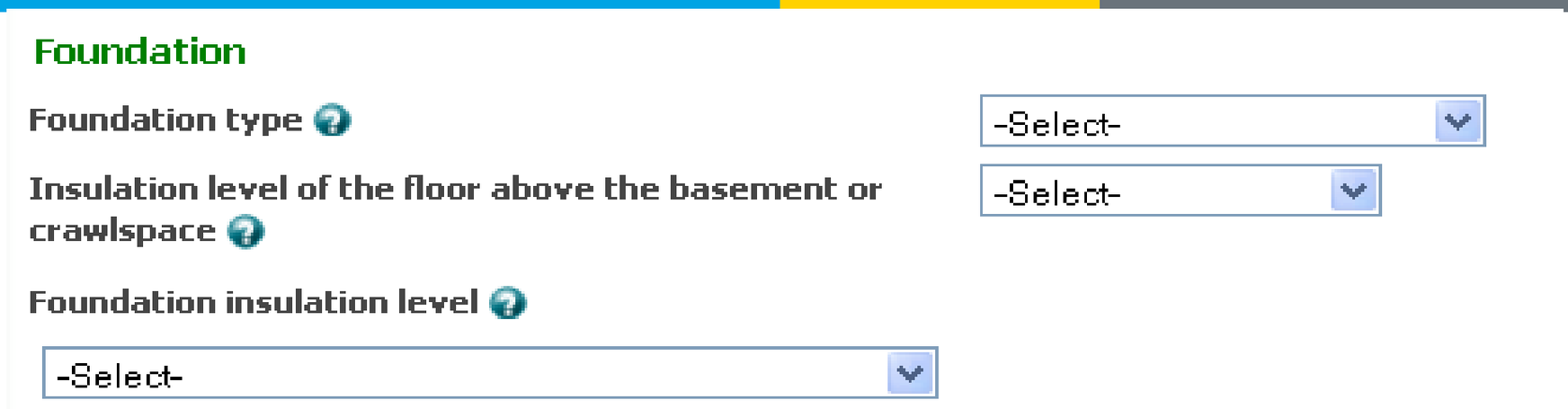



- Attic
  - Choose the ceiling type that covers more than 50% of the house footprint:
    - Attic or ceiling type:  unconditioned, conditioned, or cathedral
    - Insulation level of the attic floor:  Choose a drop down value between None and R-60

# Roof and Attic

- The scoring tool will allow one attic ceiling and one roof insulation type.
- Remember, if there are multiple ceiling or roof types, give an estimation that most closely reflects how the house works.
  - For example, if there are two attic spaces -- one with R11 insulation and one with R-30 -- perform a UA calculation to determine the proper insulation level to use as the average R-value for the total ceiling area (see example calculation below).

# Foundation




- Foundation
  - Choose the foundation type that underlays more than 50% of the house footprint:
    - Basement  - conditioned or unconditioned
    - Crawlspace – vented or unvented
    - Slab-on-grade
  - Insulation Level:  Enter separate values (choose from options provided) for --
    - Insulation level of the floor above the **unconditioned** basement or crawlspace:
      - » Use the drop-downs here to indicate the insulation installed in the joist spaces above the **unconditioned** basement or crawlspace.
    - Foundation Insulation Level
      - » Use the drop downs here for slab-on-grade and conditioned basement or conditioned crawlspace foundation walls.
  - Do not choose values for both insulation level inputs.

# Foundation Information

- As with ceilings and roof, the scoring tool will accept only one foundation type.  If there are multiple foundation types, use your best judgment and a UA calculation to best characterize the energy use of the house with one set of values.

# Example UA calculation

- A house has two attic spaces. The first is 600 sq. ft. and is insulated to R-11 using fiberglass batts. The second is 350 sq. ft. and is insulated to R-38 using blown cellulose. Remember R = 1/U and U = 1/R
- What is the calculated R-value for the combined area?
  - R-11 = U-0.091 and R-38 = U-0.026
  - UA = 0.091 * 600 sq. ft. + 0.026 * 350 sq. ft.
  - UA = 54.6 + 9.1 = 63.7
  - U = 63.74 / (600 sq. ft. + 350 sq. ft.) = 0.067
  - R = 1/U = 1/0.067 = 14.9

OR

  - UA = A/R = 600 sq. ft./11 + 350 sq. ft./38 =
  - UA = 54.5 + 9.2 = 63.7
  - U = 63.74 /(600+350) = 0.067
  - R = 1/U = 1/0.067 = 14.9

# Wall Information

- Wall Information –
  - Indicate whether the walls are the same on all sides using the Yes/No buttons at the top
    - If they are the same, complete one set of inputs.
    - If at least on is different, complete 4 sets of inputs
  - Use the matrix to choose one value for construction type (e.g. wood frame, structural brick, concrete block, etc); exterior covering (e.g. wood siding, stucco, brick veneer, etc); and cavity insulation level.
  - OVE (not shown) is “optimum value engineering” and is a method of reducing the number of studs used to build a house and provide space for more insulation.

**Walls are all same construction** ○ Yes ○ No

Selecting "Yes" sets all the walls to the type chosen above. If you select "No" we will ask about the other walls on the next page.

**Wall Construction Front**

Wood Frame

| Insulation Level | Wood Siding | Stucco | Vinyl Siding | Aluminum Siding | Brick Veneer | None |
|---|---|---|---|---|---|---|
| R-0 (no insulation) | ○ | ○ | ○ | ○ | ○ | |
| R-3 (1-2 inches) | ○ | ○ | ○ | ○ | ○ | |
| R-7 (2-3 inches) | ○ | ○ | ○ | ○ | ○ | |
| R-11 (3-5 inches) | ○ | ○ | ○ | ○ | ○ | |
| R-13 (5-6 inches) | ○ | ○ | ○ | ○ | ○ | |
| R-15 (6-7 inches) | ○ | ○ | ○ | ○ | ○ | |
| R-19 (7-9 inches) | ○ | ○ | ○ | ○ | ○ | |
| R-21 (9-10 inches) | ○ | ○ | ○ | ○ | ○ | |

Wood Frame with Insulated Headers

| Insulation Level | Wood Siding | Stucco | Vinyl Siding | Aluminum Siding | Brick Veneer | None |
|---|---|---|---|---|---|---|
| R-11 (3-5 inches) | ○ | ○ | ○ | ○ | ○ | |
| R-13 (5-6 inches) | ○ | ○ | ○ | ○ | ○ | |
| R-15 (6-7 inches) | ○ | ○ | ○ | ○ | ○ | |
| R-19 (7-9 inches) | ○ | ○ | ○ | ○ | ○ | |
| R-21 (9-10 inches) | ○ | ○ | ○ | ○ | ○ | |

Wood Frame with Expanded Polystyrene Sheathing (EPS)

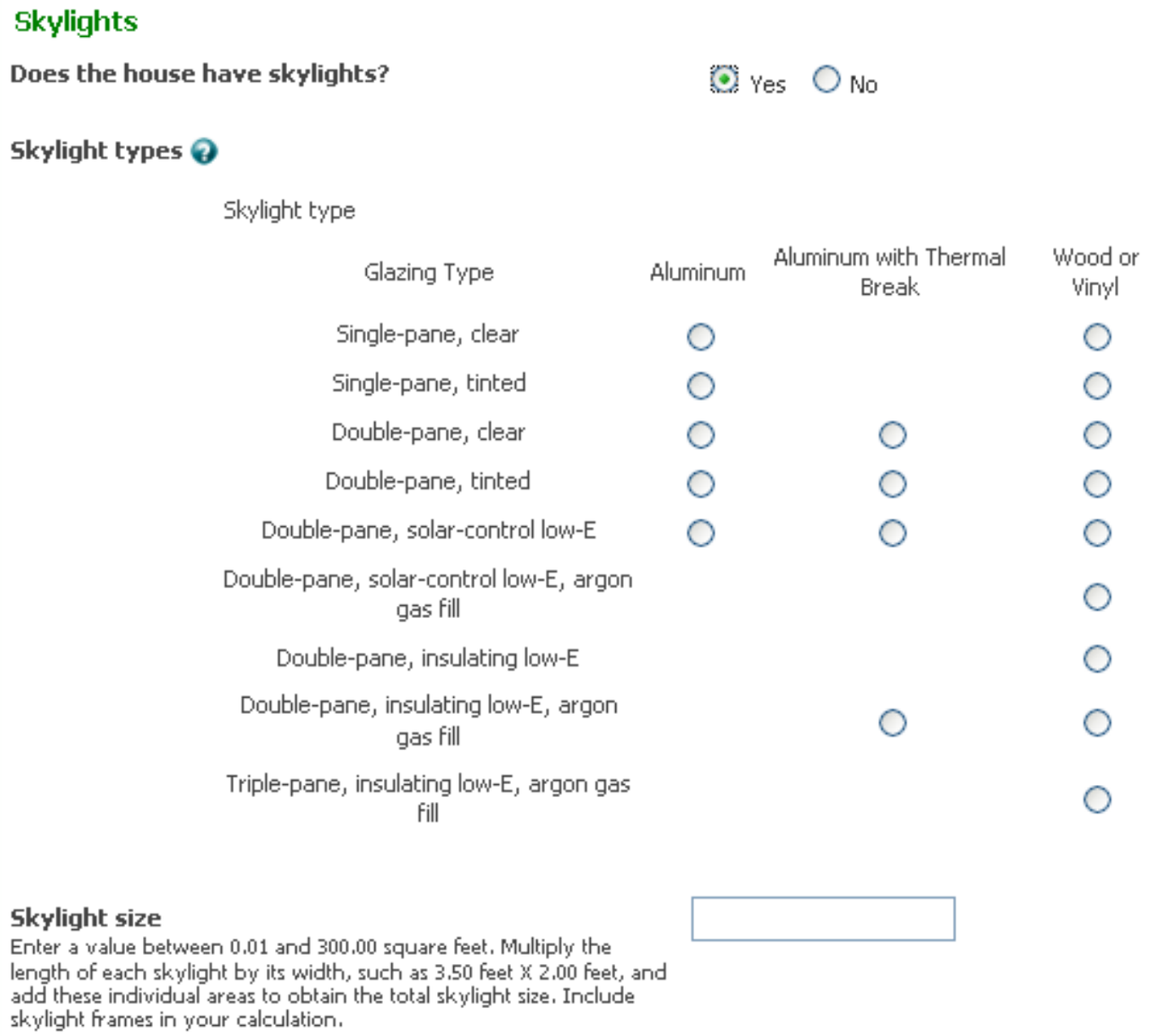
| Insulation Level | Wood Siding | Stucco | Vinyl Siding | Aluminum Siding | Brick Veneer | None |
|---|---|---|---|---|---|---|
| R-0 (no insulation) | ○ | ○ | ○ | ○ | ○ | |
| R-3 (1-2 inches) | ○ | ○ | ○ | ○ | ○ | |
| R-7 (2-3 inches) | ○ | ○ | ○ | ○ | ○ | |
| R-11 (3-5 inches) | ○ | ○ | ○ | ○ | ○ | |
| R-13 (5-6 inches) | ○ | ○ | ○ | ○ | ○ | |
| R-15 (6-7 inches) | ○ | ○ | ○ | ○ | ○ | |

# Wall Information

- As with the attic, the tool allows only one wall type per side.  Use your best judgment and a UA calculation to determine the appropriate values to be entered to properly characterize the house with one set of values.
- Wall areas are automatically calculated by the software based on the house square footage, foundation type and number of floors above grade and an assumed 8 foot average ceiling height.

# Skylights

- Skylights
  - Indicate if the house has skylights by choosing the appropriate radio button.
  - If Yes, use the matrix to choose the one value for frame and glazing then enter the total area of all skylights
  - If no, skip to windows

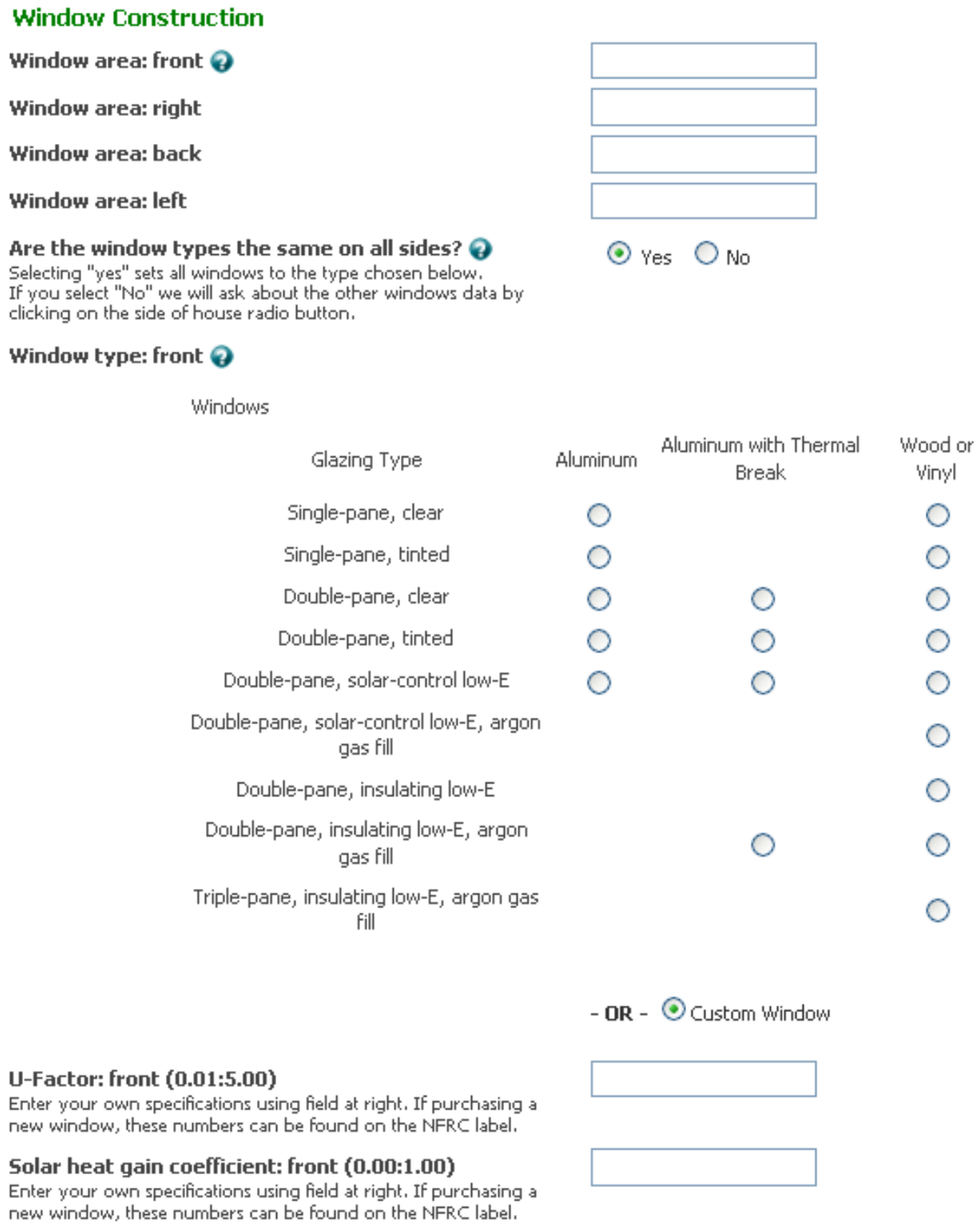


# Windows Information

- Windows
  - Enter total window area for each side of the house
  - Determine Right and Left by facing the house from the street
  - Indicate if all windows are the same type on all sides
    - If yes, use the matrix to choose frame and glazing type for all windows
    - If no, complete 4 matrices to characterize the windows on each side of the house.
    - If there is more than one type of window on a house side, characterize all of them based on the type with the largest combined size

OR

  - Input U-factor and SHGC (solar heat gain coefficient) if that information is available

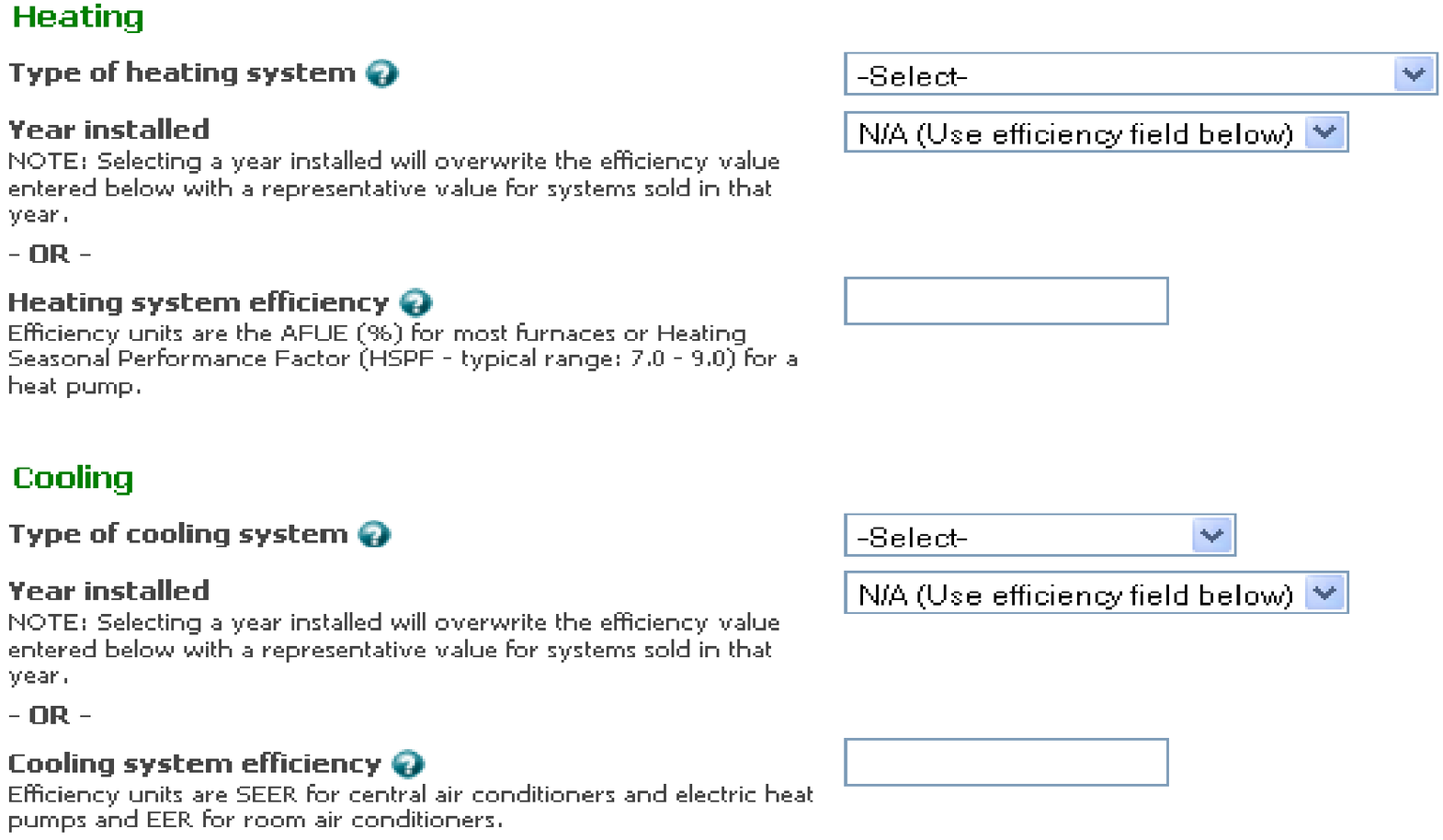


# Windows and Skylights

- If there are multiple window or skylight types, enter information about the one that makes up more than 50% of the total window area.
  - Note: There is no entry for a single paned window with a storm window.  Designate those windows as “double-pane”.

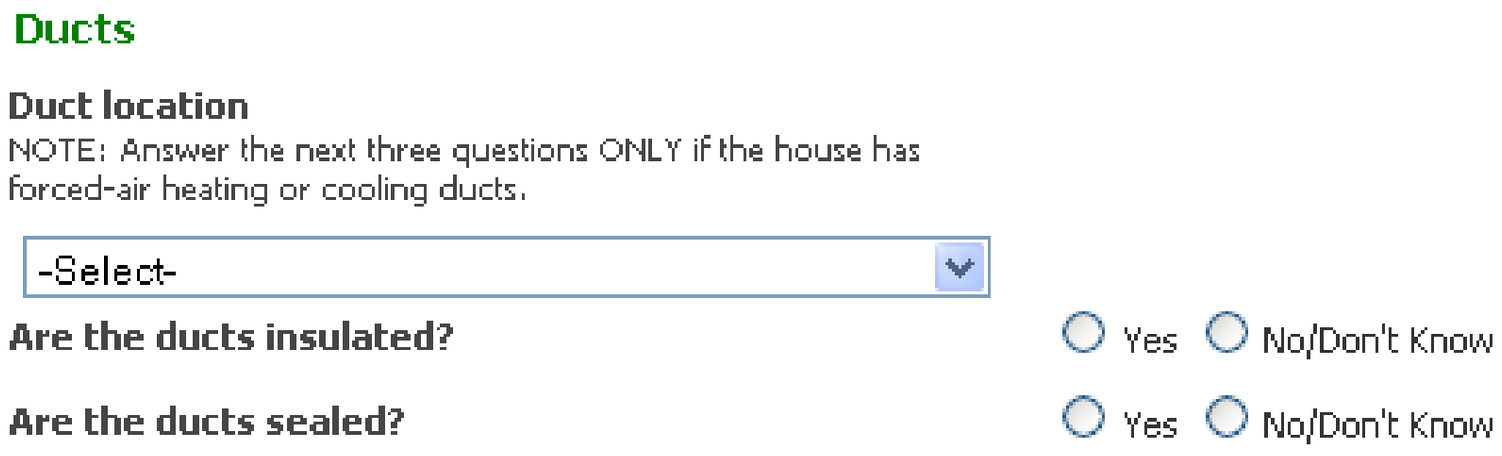
# Heating & Cooling

- Heating & Cooling Equipment
  - System Type:  fuel and system type
  - Efficiency or Equipment Install Date
    - If you enter age and efficiency, the efficiency will be overwritten by a statistical default value based on age



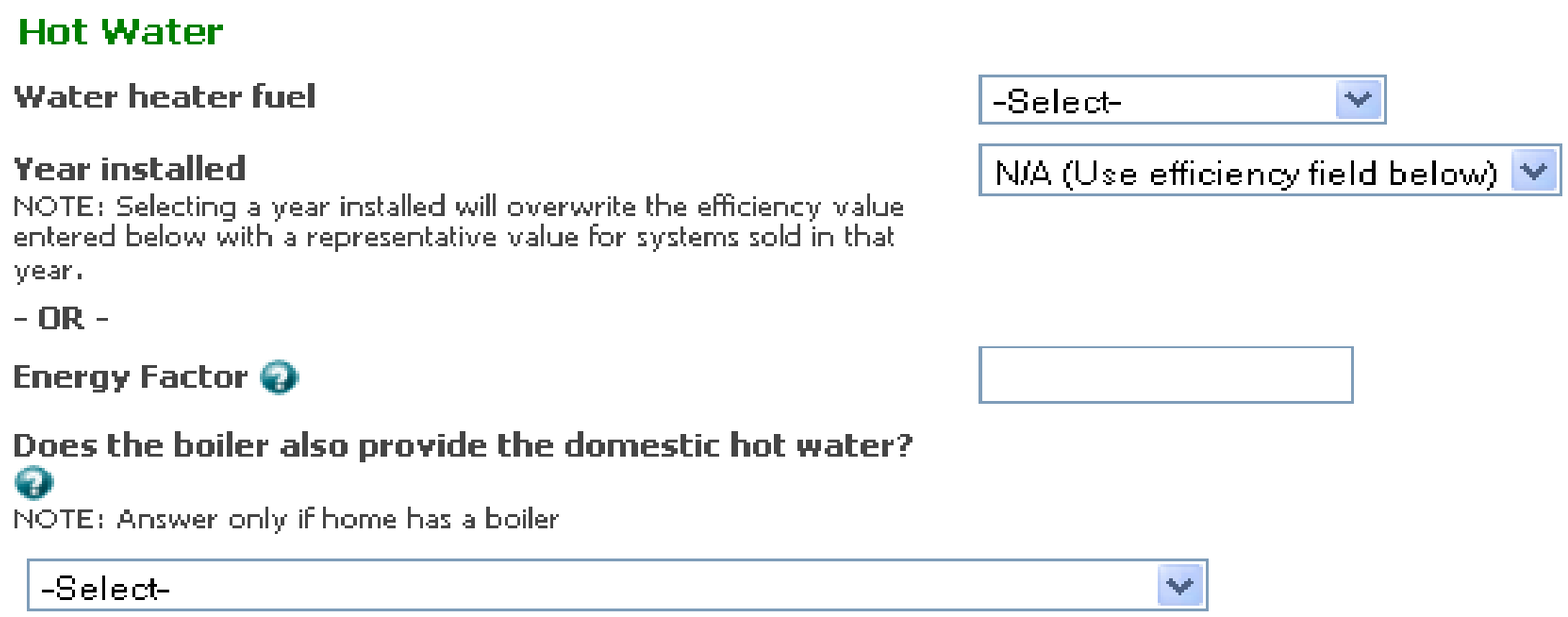
# Duct Condition

Answer these questions only if there is forced air HVAC (heating OR cooling).




- Duct Location – choose location where more than 50% of ducts are installed
  - Choose conditioned space, unconditioned basement or unvented crawlspace, vented crawlspace, unconditioned attic, unknown/not applicable
- Are the ducts insulated? – Choose Yes or No
- Are the ducts sealed? – If they have not been sealed with mastic, UL181 tape, or the aerosol sealing method the answer should be “No”.

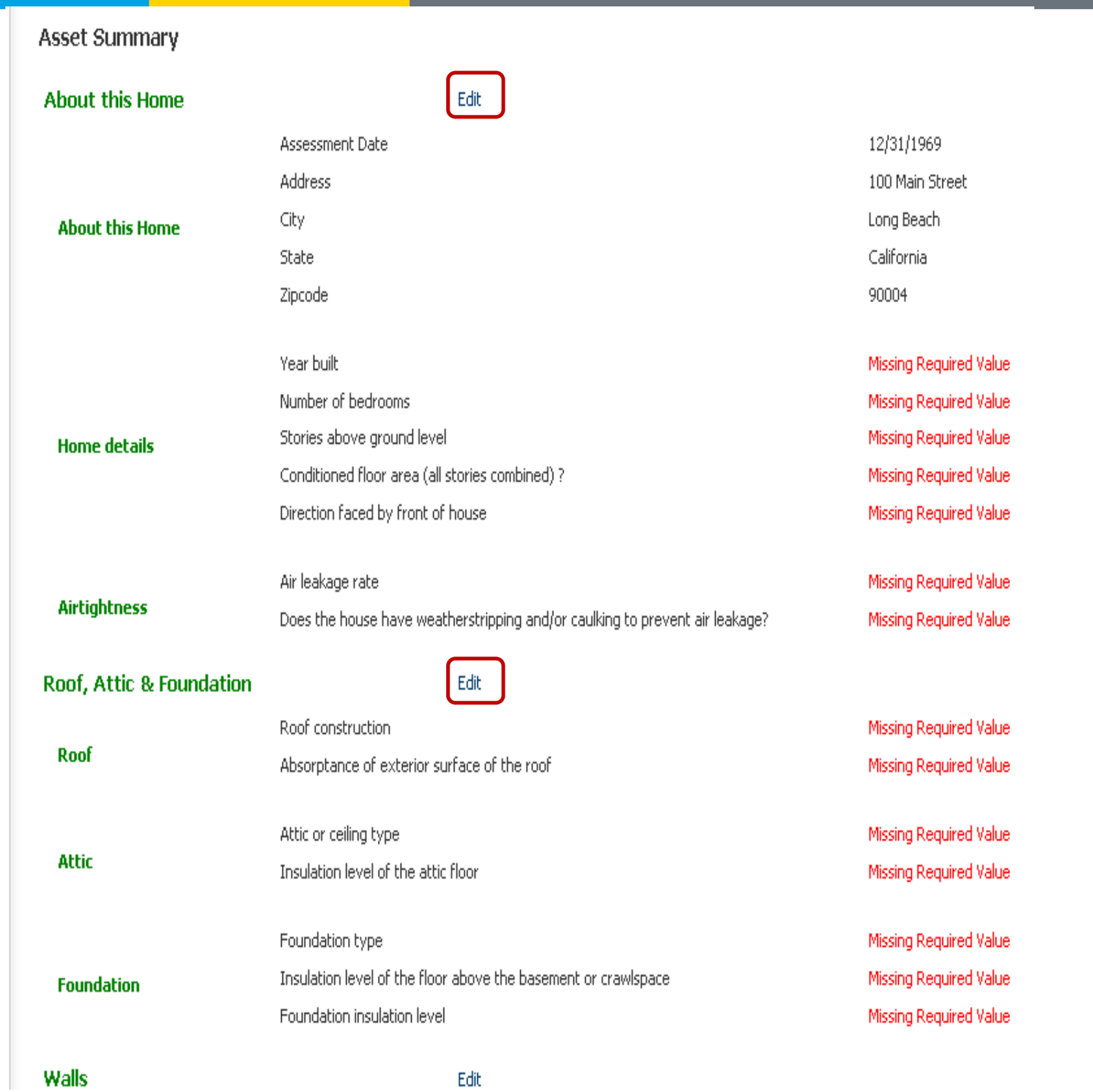
# Domestic Hot Water (DHW)



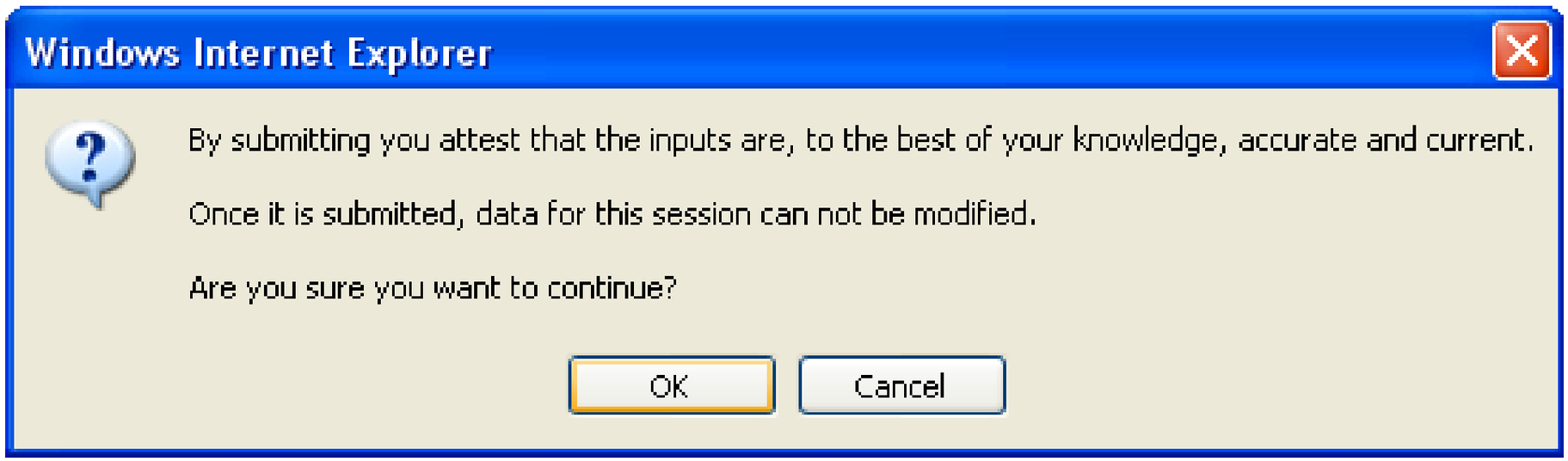

- Hot Water System
  - Fuel
  - Year Purchased
  - Energy Factor
  - Does the boiler also provide the hot tap water?
    - Only answer this if the house has a boiler (<4% of the existing building stock have this type system)

# Asset Summary

- After entering the data, click on “Asset Summary” on the left margin on the screen
- This will display a summary of the information that was entered.
- Entry errors are indicated with red font messages. Click on “Edit” in associated section header to go directly to the area that needs correction.
- Once all required values are filled in, click “Generate Label” at the bottom of the screen.



# Before Submission




- An alert message will pop up
  - By clicking “OK”, you attest that the inputs are to the best of your knowledge, accurate and correct.
  - Once it is submitted, data for this session can not be modified.
- If you want to go back and change values, click “Cancel”.
- Once you click “OK” the Score cannot be changed for this run.
- If multiple Scores have been provided for the same address (e.g. after improvements), the one with the most recent date is the Score for that house.

# Home Energy Score Report

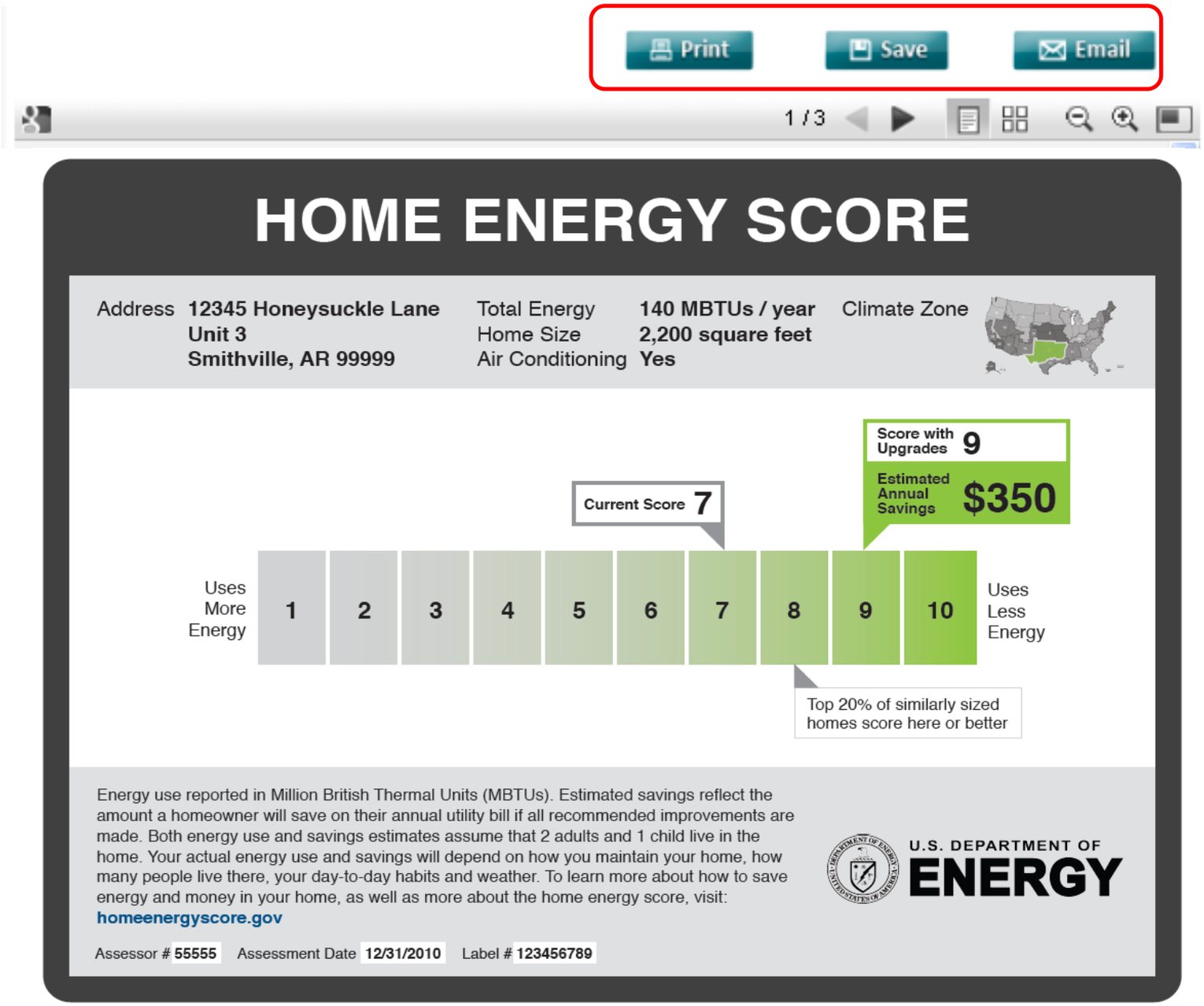
- The tool produces four separate documents:
  (1) Home Energy Score
  (2) Useful Tips
  (3) Customized Recommendations
  (4) Summary Page of Inputs

- You must provide all four of these documents to the customer, unless…
  – you are performing this assessment as part of a more comprehensive home energy audit AND
  – you are providing a different set of energy upgrade recommendations generated from a different software tool.

- If you meet these criteria and choose to provide your own list of recommendations, you must still provide the score, tips, and summary page to the customer.

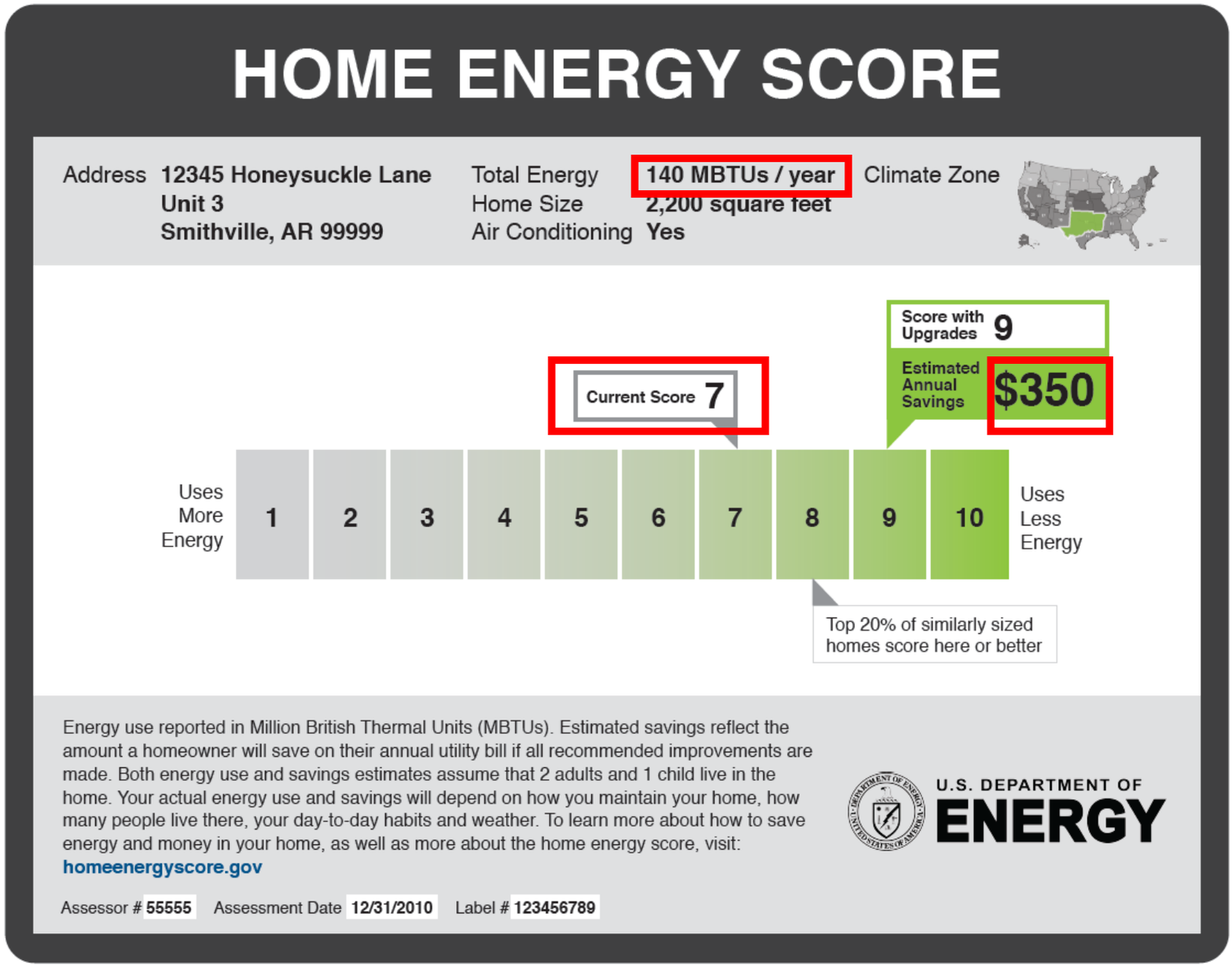
# Home Energy Score Report

- The Score documents can then be saved, printed or emailed by selecting among the icons on the page.



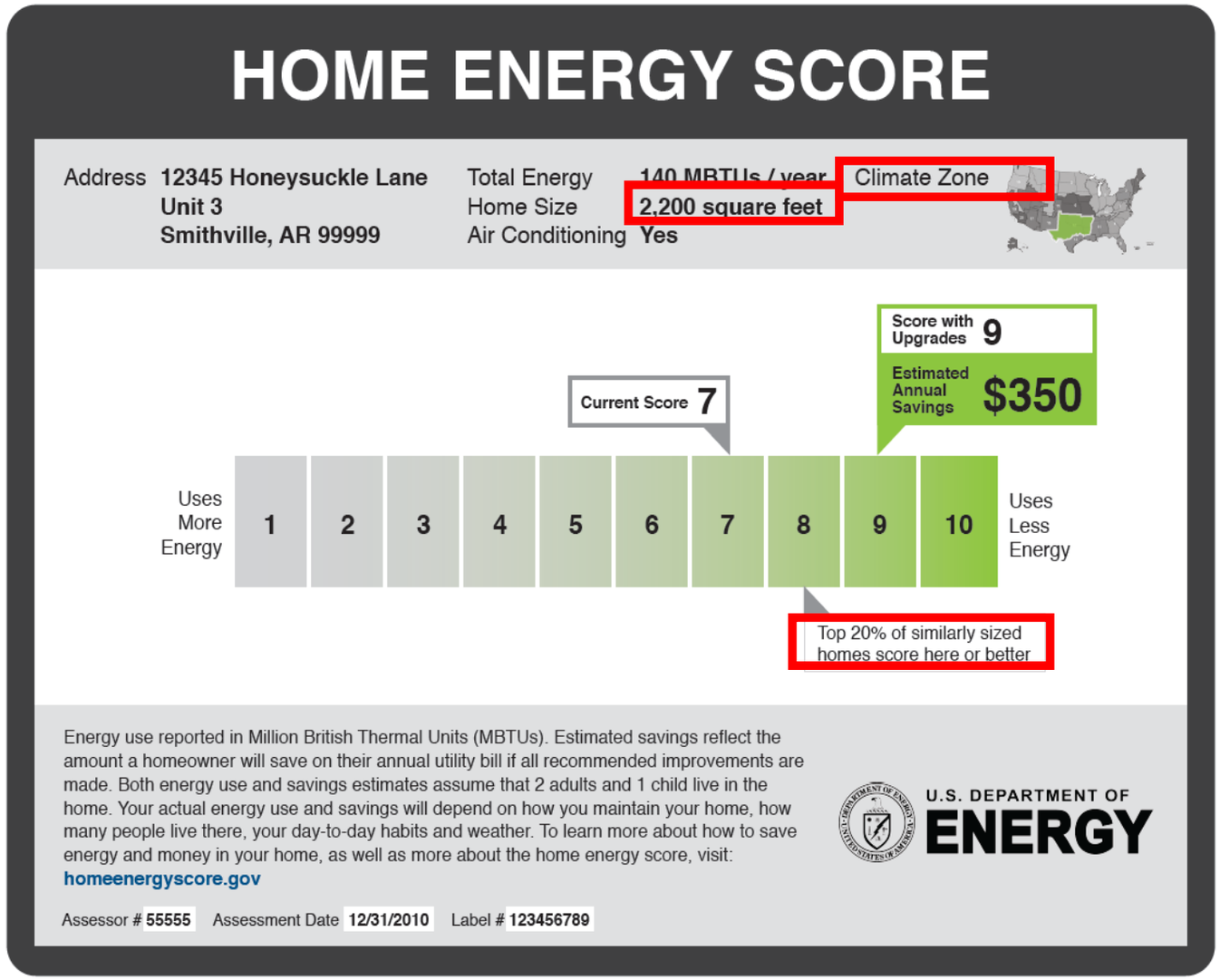
# Home Energy Score: Score Calculations

- Based on your inputs, the tool estimates total energy (source MBTUs) for the home, assuming certain standard conditions, such as 3 occupants.
- The tool then translates the total source energy into a score ranging from 1 to 10 where 10 is the best.
- The score is considered an “asset” score since it does NOT account for the behavior of the specific individuals currently living in the home.
- The dollar savings estimate represents that amount of money a typical homeowner in this home would save on their annual utility bills by making all of the upgrades recommended by the tool. Actual savings may be lower or higher depending upon a number of factors including occupant behavior.



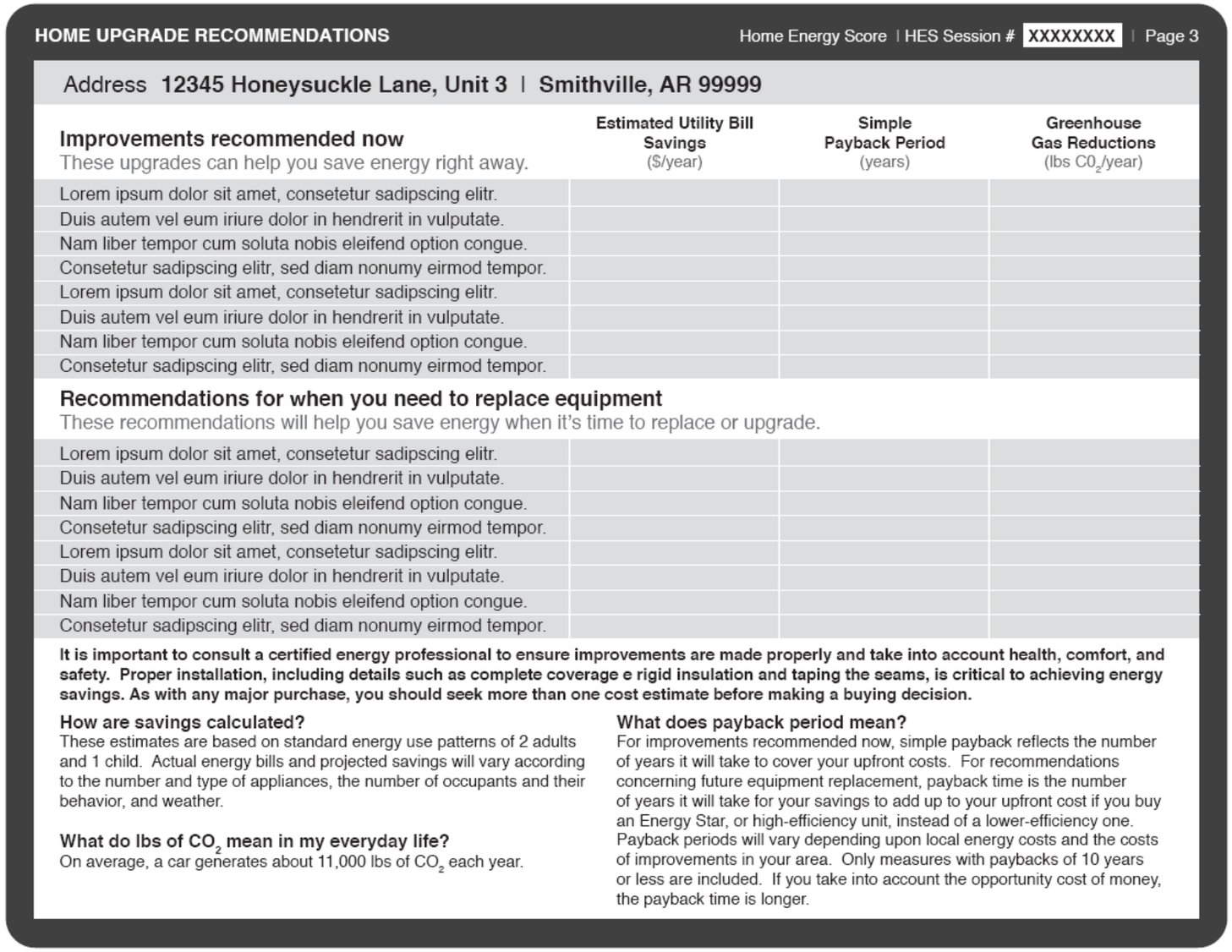
# House Size & Climate

- The tool does <u>not</u> factor house size into the score.
- However, the scale notes where the top 20% of similarly sized homes rank as a reference point.
- If the home is less than 2200 square feet, it is considered smaller; if it is more than 2200 square feet, it is considered larger.
- Typically, the top 20% of smaller homes score 9 or better; and the top 20% of larger homes score 8 or better.
- The score <u>does</u> take into account the climate.
  - For example, a home that scores an 8 in Minneapolis uses more energy than a home that scores an 8 in San Diego, given the climatic differences of those locations.



# Recommendations

- The customized recommendations are divided into two types:
  - Those to be done now.
  - Those to be done when it is time to replace.
- The recommendations are prioritized by payback in years.
- For the replacement recommendations, the payback is based on how long it would take to recover the incremental cost of buying an efficient model rather than an inefficient model.
- Utility bill savings are calculated using average state utility rates.



**HOME UPGRADE RECOMMENDATIONS** Home Energy Score | HES Session # XXXXXXXX | Page 3

Address **12345 Honeysuckle Lane, Unit 3 | Smithville, AR 99999**

| **Improvements recommended now**<br>These upgrades can help you save energy right away. | **Estimated Utility Bill Savings**<br>($/year) | **Simple Payback Period**<br>(years) | **Greenhouse Gas Reductions**<br>(lbs $CO_2$/year) |
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| **Recommendations for when you need to replace equipment**<br>These recommendations will help you save energy when it's time to replace or upgrade. | | | |
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**It is important to consult a certified energy professional to ensure improvements are made properly and take into account health, comfort, and safety. Proper installation, including details such as complete coverage e rigid insulation and taping the seams, is critical to achieving energy savings. As with any major purchase, you should seek more than one cost estimate before making a buying decision.**

**How are savings calculated?**
These estimates are based on standard energy use patterns of 2 adults and 1 child. Actual energy bills and projected savings will vary according to the number and type of appliances, the number of occupants and their behavior, and weather.

**What do lbs of $CO_2$ mean in my everyday life?**
On average, a car generates about 11,000 lbs of $CO_2$ each year.

**What does payback period mean?**
For improvements recommended now, simple payback reflects the number of years it will take to cover your upfront costs. For recommendations concerning future equipment replacement, payback time is the number of years it will take for your savings to add up to your upfront cost if you buy an Energy Star, or high-efficiency unit, instead of a lower-efficiency one. Payback periods will vary depending upon local energy costs and the costs of improvements in your area. Only measures with paybacks of 10 years or less are included. If you take into account the opportunity cost of money, the payback time is longer.

# Tips

**TIPS TO SAVE ENERGY AT HOME** Home Energy Score | HES Session # XXXXXXXX | Page 2

Most home owners can reduce their energy bills and increase the comfort and safety of their home by changing some basic habits and doing more routine maintenance. Here are some easy ways to save energy and money. Savings from these measures are not included in the Home Energy Score.

### Refrigerator/Freezer

- If your extra refrigerator is only used once in a while, unplug it and prop the door open when it's empty.
- If your extra refrigerator doesn't have much in it, consider replacing it with a smaller Energy Star model.

### Laundry

- Use cold water to wash your clothes. Most detergents clean just as effectively and clothes don't fade as fast.
- Hang your clothes on a line to dry, when appropriate.
- If you use a clothes dryer, set the timer to Autodry so the dryer stops when your clothes are dry. This saves energy and is better for your clothes.
- Clean the dryer lint trap before each use. Clean the dryer vent hose every 6 months, more if you dry a lot of clothes. Be sure your vent hose is free of kinks.

### Heating and Cooling

- Install a programmable thermostat.
- During the winter, lower the thermostat setting at night and when the house is empty.
- During the summer, raise the thermostat setting at night and when the house is empty.
- Avoid the desire to turn the thermostat temperature way up or way down to make the house warmer or colder. It doesn't heat or cool the house any faster but it uses more energy.
- Use ceiling fans alone or with air conditioning. Remember to turn them off when you leave.
- Change your furnace filter every two months (during summer too, if you have central air conditioning). Do it more frequently if you have pets or see that the filters are more than a little dirty.
- Bleed the air out of the radiators within a month of turning the boiler on each winter. Don't block vents and radiators with furniture.
- Install reflectors behind the radiators on outside walls.
- Keep about 2 feet of space cleared around your outside air conditioner/heat pump compressor.

### Curtains and Blinds

- On summer days, close window shades and curtains on the south and west side of the house. On winter days, open them.
- On winter nights, close all window shades and curtains.

### Lights

- When you leave a room, turn lights off.
- Replace incandescent bulbs with compact florescent lights (CFLs).

### Computers and Other Electronics

- Use the energy saver settings on computers and other electronics so they go to sleep when you are not using them.
- Plug groups of electronics together into one power strip. Turn off the whole powerstrip off when they are not in use.

### Water

- Fix leaky faucets and running toilets right away.
- Install low-flow showerheads and faucet aerators.

### Buying and Replacing Appliances, Windows and Other Equipment

When you buy or replace appliances, windows or other equipment, be sure to pick ones that have an ENERGY STAR label. If there are no ENERGY STAR choices, compare the products' energy use specifications and pick one that is more energy efficient.

**Whole House upgrades save energy and money and can make your home more healthy, comfortable and safe to live in.**
For even bigger savings, ask a certified energy professional about "whole house" energy upgrades. Qualified professionals can help you pick the right kind and size of equipment and make sure it is installed correctly. They also help you understand the health, comfort and safety considerations of your decisions when planning improvements.

- The tool also provides one page of general tips for reducing home energy use.

# Summary Page

- The tool provides a summary page so that the homeowner can have a record of the values the assessor used to generate the score.
- The Score is valid for three years if no energy upgrades (that relate to the data fields required by the tool) are made to the house.
- If you have trouble while using the Tool, click on Help, then “Let us Know” at the bottom of the page.
  - Complete the form, the help desk will respond by email.

# New or More Information

- If any energy-related characteristics of the house change (e.g. after retrofit) or you realize that an entry was incorrect, you will need to start over and re-enter the full set of data to get an updated or corrected Score.
  - The most recent dated score documents are regarded as the governing score for that property address
- The Home Energy Scoring Tool is linked to two other software tools created by Lawrence Berkeley National Laboratory: Home Energy Saver and Homer Energy Saver Pro (HES and HES Pro).
- If the homeowner would like additional recommendations that reflect their particular behavior, the HES or HES Pro websites allow the assessor or homeowner to model additional details about the home and homeowner. The inputs from the scoring tool assessment will automatically be uploaded into HES or HES Pro by entering the scoring session i.d. number. That number is located in the header of the Scoring Recommendations page.